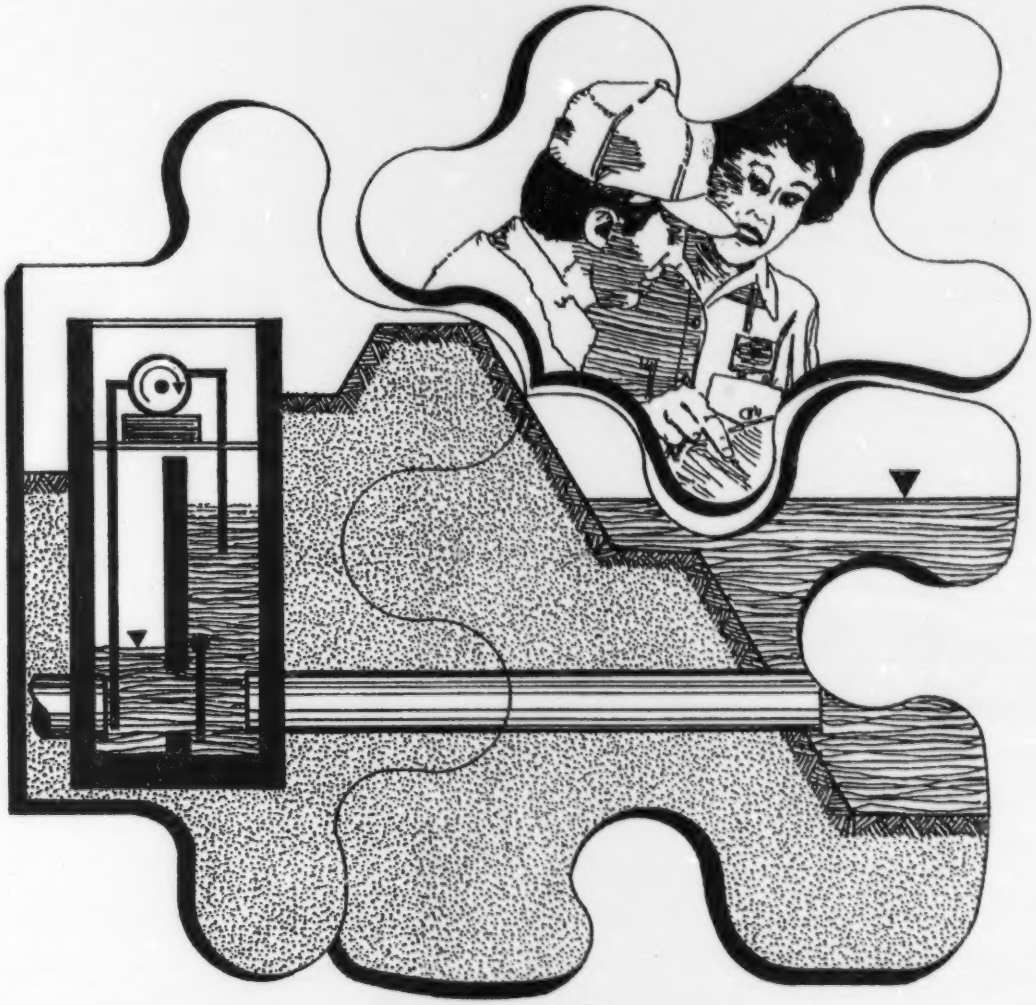
THE ANNUAL REPORT

OF THE

DYKING COMMISSIONER

•FOR THE YEAR ENDING DEC. 31, 2001•



SUBMITTED TO:

The Hon. **Oscar Lathlin**

Minister

Conservation

SUBMITTED BY:

R. Hay P. Eng.

Dyking Commissioner

102-05428/

THE ANNUAL REPORT

OF THE

DYKING COMMISSIONER

FOR THE YEAR ENDING

DECEMBER 31, 2001

Contents

		Page
1	Acknowledgements	2
2	The Dyking Authority Act of 1952	2
3	Changes Since 1952	3
4	Current Issues and Actions	4
5	Inspection of Facilities	6
6	Reports by the City of Winnipeg and the University of Manitoba	6
7	Primary Dyking System Report	7
8	Additional Works Constructed	7
9	Recommendations	8
10	Appendix A - City of Winnipeg - List of Flood Pumping Stations and Gate Chambers	9
11	Appendix B - City of Winnipeg Maps	11
12	Appendix C - Copy of Questionnaire	12
13	Appendix D – Replies to Questionaire	13
14	Appendix E - Revised Rules of Operation for the Red River Floodway Inlet Control Structure	14

1 Acknowledgements

Evaluation of the adequacy of the dyking system is based mainly on reports provided by the staff of the City of Winnipeg and the University of Manitoba. Their cooperation in providing annual reports and technical advice is gratefully acknowledged.

2 The Dyking Authority Act of 1952

The Dyking Authority Act D110, passed in 1952, was intended to ensure that the dykes and pumping stations constructed subsequent to the 1950 flood were maintained in a state of readiness to combat future floods. In fact, the full title of the original Act was *An Act to Provide for the Maintenance of Dykes and Pumping Stations in Greater Winnipeg.*

While authority and control over dykes and pumping stations was vested with the city or rural municipality in which they were situated, provision was made for the appointment of a Dyking Commissioner with powers to inspect dykes and pumping stations and to order work to be undertaken to maintain an integrated system of flood defence as well as to establish the location of the line of defence.

The Dyking Commissioner is required to "before the first day of April in each year, make to the Minister a report on the administration and carrying out of the provisions of this Act during the year ending on the thirty-first day of December next preceding the making of the report, and on the condition of the dykes, pumping stations, and pumps, and their sufficiency for the purposes for which they were constructed or installed."

3 Changes Since 1952

Several major changes have taken place since the passing of The Act in 1952.

1. Major flood control projects affecting river water surface levels in the City of Winnipeg have been completed, namely, the Red River Floodway in 1968, the Assiniboine River - Portage Diversion and Shellmouth Dam in the early 1970's.

2. Urban development has taken place beyond the lines of flood defence previously established.

3. The five cities and two rural municipalities subject to The Act have been replaced by a single city.

4. Under the Canada-Manitoba Flood Damage Reduction Agreement, Interim Flood Risk Maps designating Flood Risk Areas and Floodways in the City of Winnipeg were produced in 1980 and flood protection criteria for developments dictated by flood levels were defined.

5. The City of Winnipeg Act was amended in 1981 to recognize the designated flood risk areas and to establish revised criteria for development in flood prone areas.

6. As of January 1, 1992 the Designated Floodway Fringe Area Regulation 266/91 requires the Primary Dyke to be located, designed and constructed to the standard and elevation approved by the City Administrator and the Dyking Commissioner .

4 Current Issues and Actions

Changes to legislation and the dynamics of urban development give rise to issues from time to time. Issues currently being addressed include:

1. Flood defence lines continually requiring revisions to accommodate the effect of flood control/protection works and the impact of on-going urban development.

   The City is continuing to review the Primary Line of Defence (PLD) for re-designation and extensions. Plans are prepared and submitted to the Dyking Commissioner for approval. Some preliminary proposals have been reviewed with the Commissioner as noted in the City of Winnipeg report in Appendix D.
   The City has completed digital mapping of the 115 kms of primary dykes and has prepared a comprehensive set of drawings/plans. This database is to be incorporated within the City's new Flood Protection System -Operation and Maintenance Manual.

2. Since the 1997 "Flood of the Century", a number of initiatives have been undertaken with respect to enhancing the level of flood protection for the City. All have implications for future administration of The Dyking Authority Act.

   i) The International Joint Commission (IJC) initiated comprehensive studies of the City's flood defence systems that identified vulnerabilities and proposed strategies for flood risk reduction. The final report, entitled " Living with the Red", was issued in December of 2000. The Report contained several conclusions of which the following perhaps bears most significantly on the future of the Primary Dyking System in Winnipeg: "Under flow conditions similar to those experienced in 1997, the risk of a failure of Winnipeg's flood protection infrastructure is high. Public safety requires that the city, province and Canadian federal governments focus immediate attention on designing and implementing measures to further protect Winnipeg."
   - In November of 2001, KGS Group, a Winnipeg based engineering consulting firm, released a report entitled " Flood Protection Studies for Winnipeg ". The report concentrated on extension of preliminary analyses for the two options considered, at the time, the only viable means of significantly enhancing the level of flood protection for the City and surrounding area. In December of 2001, the Government of Manitoba announced a series of open meetings to be held early in 2002 at various locations in the Red River valley. The aim, presumably being, to gather public input related to planning and funding the substantial physical works required to significantly improve Winnipeg's chances of avoiding major flood damage in the future.

The IJC also endorsed several recommendations of its own task force, specifically;

-Recommendation #7- "The Primary Dyking system for Winnipeg should be raised where economically feasible to the elevation specified in existing legislation."
There remain several locations within the City where the designated primary line of defence is slightly below the Flood Protection Level for short distances. The City has identified these reaches for permanent upgrading as programming allows.

-Recommendation #10- "Modifications to the sewer and land drainage systems of Winnipeg should be optimised and undertaken once the overall plan for Winnipeg flood protection is determined."
The City has identified and scheduled the required works for future infrastructure plans. There are several components of this work that can be implemented at any time. They are independent of the overall design standard to be selected for enhancing the level of flood protection for the City.

-Recommendation #11- "The City should give immediate high priority to the preparation of a detailed emergency preparedness and response manual".
Work is nearing completion on the comprehensive Flood Activity/ Emergency Operations Manual for the City's flood protection infrastructure.

ii) The City entered into an agreement with both the federal and provincial governments to provide enhanced secondary flood protection works (i.e. on the river side of the Primary Line of Defence). The agreement, whose term currently extends to March 31, 2003, provides a total of $11.1 M for upgrades to both individual property site flood protection and community ring dykes within the City Limits. The Dyking Commissioner is a member of the Technical Advisory Committee that co-ordinates the implementation of the agreement, as several of the proposed works lie within the designated Floodway Fringe of the Red River. As of December 2001, several individual residence projects had been completed and several condominium and community ring dyke projects were well underway. The installation of riverbank stabilization works was initiated to facilitate the construction of an improved secondary dyke around the Elm Park Peninsula for the residents of Kingston Row/Crescent. The design and tendering of similar works was completed for a secondary dyke protecting homes on North Drive and for

three large condominium towers in downtown Winnipeg on Wellington Crescent and Roslyn Road.

iii) Further to a recommendation from the Manitoba Water Commission-June 1998 Report, the Province presided over a committee established to review the operating rules for the Red River Floodway. The ad hoc Floodway Operation Review Committee (FORC) was comprised of representatives from Manitoba Water Resources Branch, the Federal government (PFRA), the City of Winnipeg and the Rural Municipal Councils of the three municipalities immediately upstream of the Floodway Inlet. The Committee's final report was entered on the public registry. The report's recommendations have received federal government ratification. Manitoba proceeded to establish, as recommended, the annual Red River Floodway Operation Advisory Board to oversee the determination of the Inlet Structure gate settings for the spring runoff of 2001. The revised Rules of Operation have been included in this report as Appendix 'E'.

5 Inspection of Facilities

The City of Winnipeg and the University of Manitoba have ongoing inspection and maintenance programs. The programs for 2001 are described in detail in the reports under Appendix D.

Recognition is hereby acknowledged that the City and University apply appropriate levels of care to the maintenance of their respective flood protection facilities.

6 Reports by the City of Winnipeg and the University of Manitoba

A questionnaire was sent to the City and to the University requesting information for the purpose of preparing this report. A copy of the request and questionnaire is included in Appendix C. The replies to the questionnaire, included in Appendix D, indicate that regular monitoring, detailed inspections and necessary maintenance work was carried out.

7 Primary Dyking System Report

1. Pumping Stations and Gates

Operational activities began early in April coincident with spring run-off flow conditions. High precipitation on the upper Red River basin in early July again required the activation of several gates and pumping stations from late July to mid-August as described in the attached Appendix 'D'.

Normal annual maintenance activities were undertaken on the pumping stations and gate chambers in 2001. The City's Water and Waste Department continued to upgrade the lift station alarm and monitoring systems, and both the flap style and positive gate configurations at the automated stations.

The University of Manitoba completed repairs to the No. 1 sewer outfall gate structure.

The specific details of these programs are outlined in the attached Appendix D.

2. Primary Line of Defence

Operation: No dyke closures or dyke raising operations were required in 2001 with respect to the primary dykes. Operations were confined to normal gate closures and sewer pumping. The "Forks" river walkway was inundated for much of August due to the excessive summer precipitation.

Administration: Updated drawings are included in Appendix B indicating the most recent authorized revisions to the Primary Line of Defence within the City of Winnipeg.

8 Additional Works Constructed

No major additional works were undertaken in 2001. Planning and construction continues for two projects in which modifications to the Primary Line of Defence are incorporated, namely, Waterfront Drive and the new Provencher Bridge.

9 Recommendations

It is recommended the City of Winnipeg continue its efforts to complete all necessary rehabilitation and upgrading to the primary dikes, pump stations, gates and outfalls through the primary dike, to improve the integrity of the system.

The Dyking Commissioner notes that the City has undertaken approximately $5.4 million in flood mitigation work since 1997, and has an additional $29.7 million included in their 2002 to 2007 capital program. There remains identified, however, a further $140 million in works to be undertaken beyond 2007. These figures do not include the $10.4 million provided by the Province and the Federal Government for permanent secondary dikes in Winnipeg, under the Canada – Manitoba Agreement on Red River Valley Flood Protection. Further, the City is proposing to apply to the Canada – Manitoba Infrastructure Program for $ 1.3 M to construct a dyke that would facilitate the re-location of the Primary Line of Defence to the river side of homes on Kilkenny Drive.

It is recommended the City of Winnipeg, with the assistance of the Dyking Commissioner, ensure that permanent modifications to the secondary dykes do not detrimentally impact the Designated Floodway of the Red River channel, the primary dykes or local drainage outlets.

10 Appendix A

City of Winnipeg
List of Flood Pumping Stations and Gate Chambers

CITY OF WINNIPEG FLOOD CONTROL FACILITIES - 2001

PERMANENT FLOOD PUMPING STATIONS:

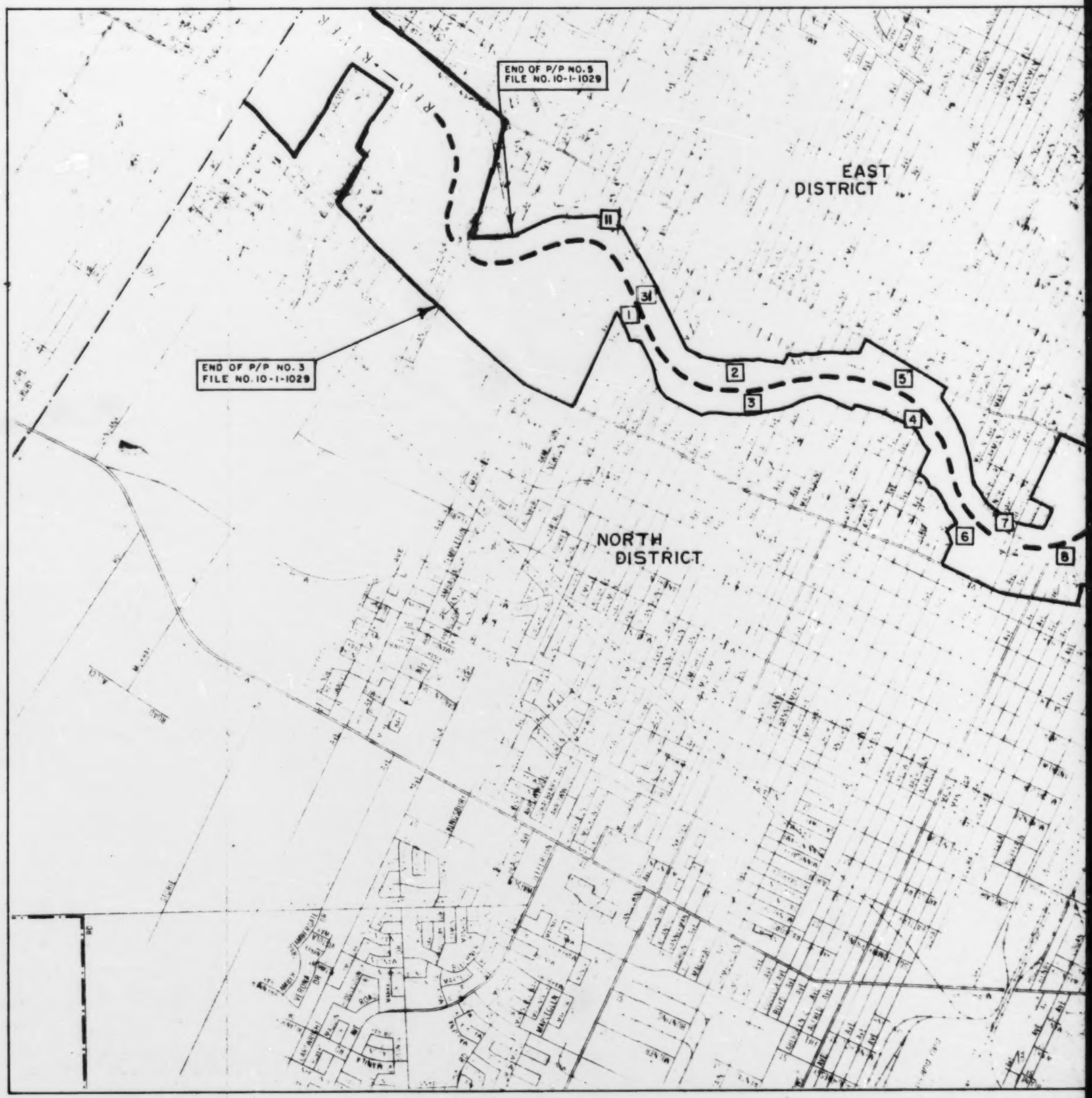
1 Newton
2 Linden
3 Jefferson
4 Polson
5 Monroe
6 St. John
7 Hart
8 Selkirk
9 Syndicate
10 Archibald Underpass
11 Hawthorne
12 Galt
13 Bannatyne
14 Assiniboine
15 Colony
16 Cornish
17 Aubrey
18 Clifton
19 Mission
20 Laverendrye
21 Dumoulin
22 Despins
23 Mayfair
24 Ash
25 Marion
26 Jessie
27 Metcalf
28 Baltimore
29 Mager Drive
30 Cockburn
31 Larchdale
32 Turnbull Drive
33 St. James Underpass
34 Roland

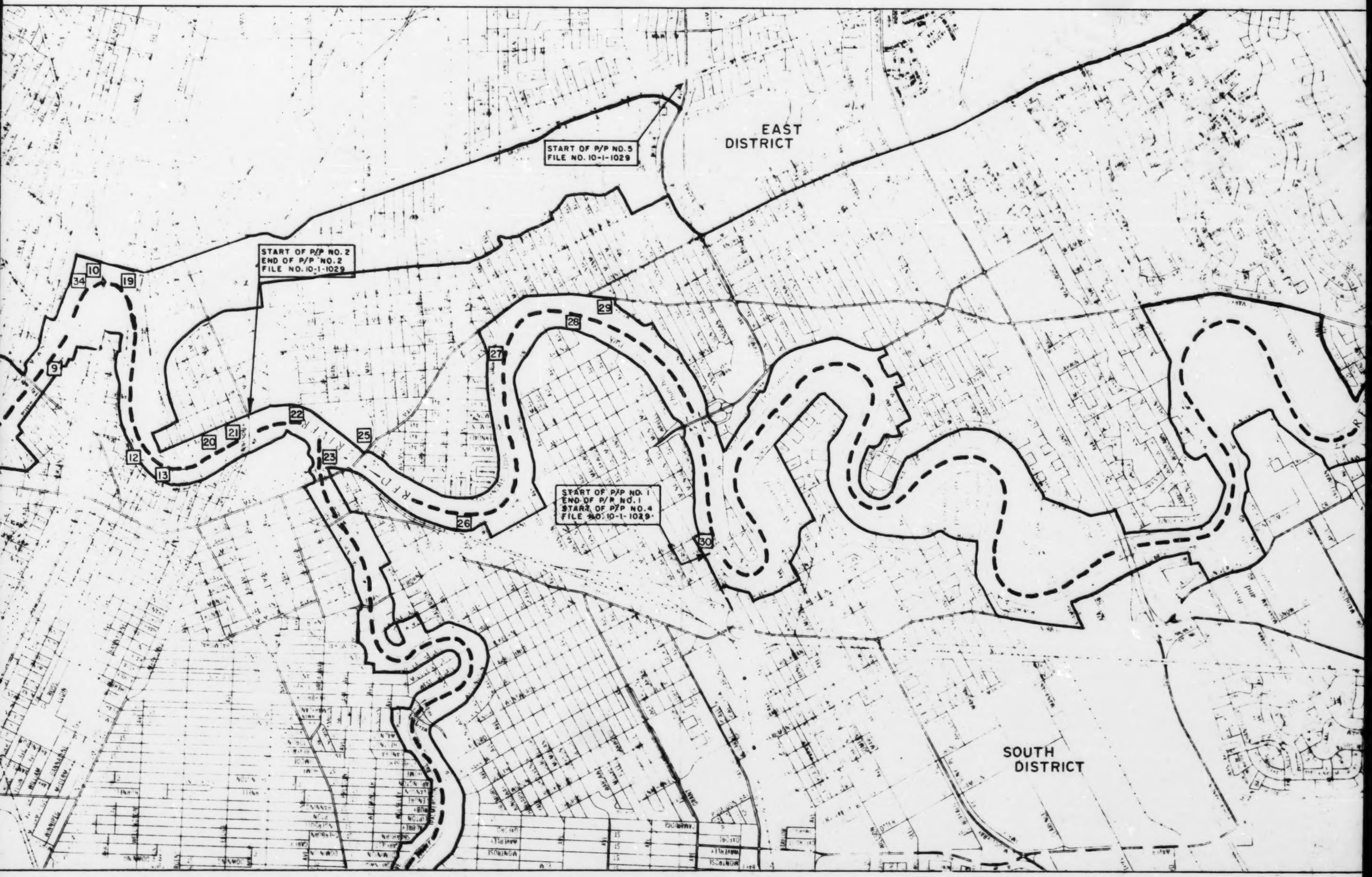
GATE CHAMBERS:

Rainbow Stage
St. Mary's Road
Armstrong
Ft. Rouge Park
Maryland
Renfrew
St. Norbert X-Kalay
Eccles (new 1200mm SRS)
Wildwood Golf Course
X-Kalay Drive Culvert
Darcy @ Glengarry
Crane @ Southdrive (WWS)
Kilkenny N. of Radcliffe
N.E. Interceptor
Ruby
Pembina & Crane
Aubrey (Storm)
Kingston Row CSO
Trappiste @ Pembina
Assiniboine E.
Assiniboine W.
Burrows
Calrossie @ Riverside
Ducharme @ Villineuve
Eccles (old 750mm SRS)
Kilkenny & Rice
Lombard
McDermot
Spence
Somerset @ Riverside
Bredin Drive
Canora
Guay
Churchill Drive Underpass
Churchill High School
Bredin Drive
Chataway
Deer Lodge Place
Douglas Park
Ferry Road
Kildonan Park
Lemay & Lord
Olive Street
Conway
Cranestorm
Donald Street
Dowker Outfall
Osborne @ St. Vital Bridge G.C.
Hargrave Street
Inkster
Kennedy
Kingston Row Underpass
Riviera Crescent Outfall
Water Avenue
Clarence & Hamlin
Colony
Dieppe
Hawthorne
Parkside 30"
Parkville
Sommerville & Beaumont
St. Boniface Hospital MH
Kildare
Riverdale
McLeod Cr. & Kildonan Cor.
Donacaster
Dunham Road
Plaza Drive
Pulberry
Seel & Fennel
Darcy 43 m N. of Glengarry
Glasgow
Summerview Lane
South St. Vital Ret. Basin
N. St. Boniface LDS
Shier Drive
Barker
Waverley Lakes
Arlington
Calrossie Outfall
Conway
Moore
Strathmillan
Wexford
Killarney
Rowandale
Ridgedale
River Point Pl.
Clifton Overflow (Omands Cr.)
Forks
Heritage
N.E. Interceptor Manhole
King Edward Storm
Kingston Row @ Elm Park
Riverbend 90"
Tylehurst
Lot 16 Gate
Fermor

11 Appendix B

City of Winnipeg Maps - Showing District Boundaries,
Flood Defence Lines and Pumping Station Locations


END OF P/P NO. 5
FILE NO. 10-1-1029
END OF P/P NO. 3
FILE NO. 10-1-1029
EAST
DISTRICT
NORTH
DISTRICT
11
3I
1
2
3
4
5
6
7
8


EAST
DISTRICT
START OF P/P NO. 5
FILE NO. 10-1-1029
START OF P/P NO. 2
END OF P/P NO. 2
FILE NO. 10-1-1029
START OF P/P NO. 1
END OF P/P NO. 1
START OF P/P NO. 4
FILE NO. 10-1-1029
SOUTH
DISTRICT
9
10
34
19
12
13
20
21
22
23
25
26
27
28
29
30

WATER BRANCH

CITY OF WINNIPEG PRIMARY DYKE

DISTRICT BOUNDARIES — —

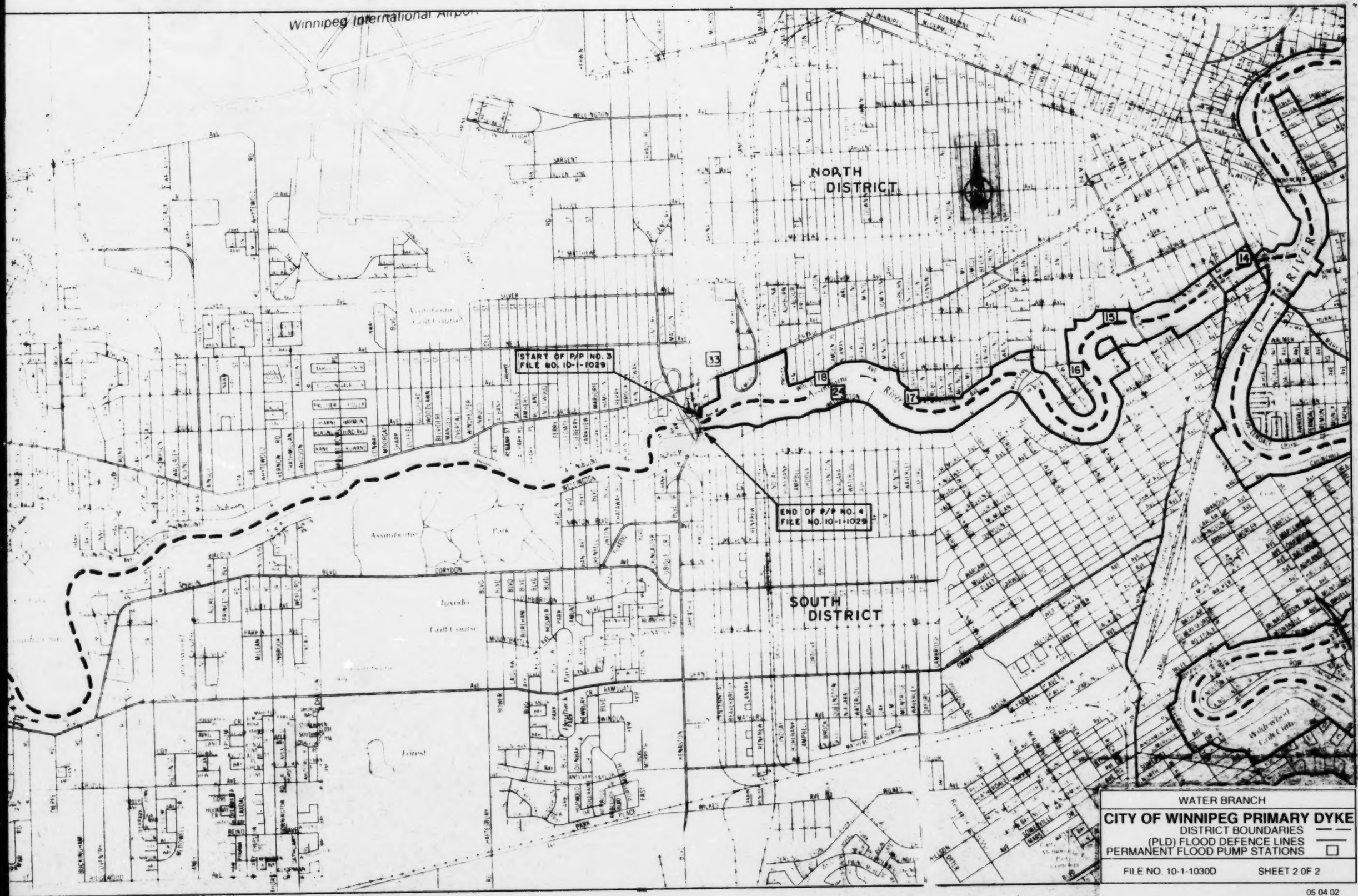
(PLD) FLOOD DEFENCE LINES ——

PERMANENT FLOOD PUMP STATIONS □

FILE NO. 10-1-1030D SHEET 1 OF 2

05 04 02

CITY LIMITS



WATER BRANCH

CITY OF WINNIPEG PRIMARY DYKE

DISTRICT BOUNDARIES — —

(PLD) FLOOD DEFENCE LINES ——

PERMANENT FLOOD PUMP STATIONS □

FILE NO. 10-1-1030D SHEET 2 OF 2

05 04 02

12 Appendix C

Copy of Questionnaire to:

The City of Winnipeg
and
The University of Manitoba

Manitoba

Conservation

Water Branch
Box 19 – 200 Saulteaux Crescent
WINNIPEG MB R3J 3W3
Phone: (204)945-6496
Fax: (204)945-7419

December 14, 2001

File: 11.1.5

Mr. Barry McBride
Director, Water and Waste Department
The City of Winnipeg
101 - 1155 Pacific Avenue
WINNIPEG MB R3E 3P1

Dear Mr. McBride:

RE: Dyking Commissioner's 2001 Annual Report

The Dyking Authority Act, Section 15, requires that:

> "The commissioner shall, before the first day of April in each year, make to the minister a report on the administration and carrying out of the provisions of this Act during the year ending on the thirty-first day of December next preceding the making of the report, and on the condition of the dykes, pumping stations, and pumps, and their sufficiency for the purposes for which they were constructed or installed."

To assist in making this report I request that you supply me with a report on the dyking system and pumping stations under your jurisdiction for the 2001 calendar year **by March 1, 2002**. For convenience, I am including a standard questionnaire similar to that used in previous years.

Yours truly,

Rick Hay, P. Eng.
Dyking Commissioner

cc: Steven D. Topping, Director
Water Branch

Enclosure

RIAH/jb

Manitoba

Conservation

Water Branch
Box 19 – 200 Saulteaux Crescent
WINNIPEG MB R3J 3W3
Phone: (204)945-6496
Fax: (204)945-7419

December 14, 2001

File: 11.1.5

Ms. Debbie McCallum
Associate Vice-President
Ancillary & Physical Resources
208 Administration Building
University of Manitoba
WINNIPEG MB R3T 2N2

Dear Ms. McCallum:

RE: Dyking Commissioner's 2001 Annual Report

The Dyking Authority Act, Section 15, requires that:

> "The commissioner shall, before the first day of April in each year, make to the minister a report on the administration and carrying out of the provisions of this Act during the year ending on the thirty-first day of December next preceding the making of the report, and on the condition of the dykes, pumping stations, and pumps, and their sufficiency for the purposes for which they were constructed or installed."

To assist in making this report I request that you supply me with a report on the dyking system and pumping stations under your jurisdiction for the 2001 calendar year **by March 1, 2002**. For convenience, I am including a standard questionnaire similar to that used in previous years.

Yours truly,

Rick Hay, P. Eng.
Dyking Commissioner

cc: Steven D. Topping, Director
Water Branch

Enclosure
RIAH/jb

13 Appendix D

Replies to Questionnaire

Winnipeg

Water and Waste Department • Service des eaux et des déchets

March 11, 2002

Our File No. 020-08-03-00-00

Manitoba Department of Conservation
Box 19
200 Saulteaux Crescent
Winnipeg, Manitoba
R3J 3W3

ATTENTION: MR. R. HAY, P.ENG., DIKING COMMISSIONER

Dear Mr. Hay:

RE: DIKING COMMISSIONER'S 2001 ANNUAL REPORT

In reply to your letter of December 14, 2001, please find attached the 2001 Flood Activity Report of the Water and Waste Department and the Public Works Department with regard to Flood Pumping Stations and the Diking System within the City of Winnipeg.

Yours truly,

Barry D. MacBride, P.Eng.
Director

/aed
Attachment

G:\C\Word\DC-Report\Dc-rep01\Report\Rick-Hay.doc

TABLE OF CONTENTS

2001 Flood Activity Report for The City of Winnipeg

		Page No.
1.0	**The City of Winnipeg Flood Control Report**	1
2.0	**Extensions and Redesignations of the Primary Line of Flood Defence**	
2.1	East Area	7
2.2	North Area	8
2.3	South Area	9
3.0	**Primary Line of Defence (PLD) Mapping**	10
4.0	**Secondary Line of Defence (SLD)**	11
5.0	**Flood Activity / Emergency Manual**	11
6.0	**Responses to Diking Commissioner's Questionnaire**	
6.1	Engineering Division – Public Works Department	12
6.2	Engineering Division – Water & Waste Department	13
6.3	Water Services Division – Water & Waste Department	13

1.0 THE CITY OF WINNIPEG FLOOD CONTROL REPORT

The City of Winnipeg, Wastewater Services Department is responsible for the Primary Line of Defence (primary dyking system) and the flood pumping stations within the City of Winnipeg. The following report summarizes the operations of these facilities for the 2001 calendar year.

Throughout the year, the Wastewater Services Department's Collection System crews inspected all flood pumping stations once per week. All stations were checked for temperature, basement flooding and vandalism. All problems were repaired as soon as possible.

Commencing in the month of February, all stations were given a complete maintenance check to ensure that these facilities were ready for operation when required. This annual servicing includes:

i) lubricating and operating all positive gates on sanitary, storm and combined sewers;

ii) inspection of all wet well floats;

iii) lubricating and operating of all pumps and equipment within the station;

iv) inspection of all electrical main boxes, starter boxes and motors;

v) inspection of all high voltage transformers and equipment;

vi) inspection of automated control system, where installed.

The Red River reached a peak of 18.5 feet above City datum at James Avenue on April 7, 2001. The river receded slowly, with periodic rises until normal summer water level was reached on July 10, 2001, at which point, flood control operations were discontinued. As a result of numerous heavy rainfalls throughout the Red River Basin during the summer of 2001 a second crest of 11.6 feet above James Avenue Datum occurred on July 31, 2001. The river returned to normal summer water levels on August 15, 2001. The graph on page 3 illustrates the 2001 high river level events, by plotting daily river levels during the year's high river level period. The table on pages 4 thru 7 summarizes the flood activities for 2001. River elevations shown on these tables are in imperial units and are recorded in James Avenue stages.

During October all of the flood pumping stations were winterized in conjunction with the routine weekly checks. Thirty (30) of the City's thirty-four flood pumping stations are now automated. The automated stations all require activation at a level equivalent to or below 20.0 feet at James Avenue datum. Continued upgrading of the City's flood and lift station alarm and monitoring system also took place in 2001, resulting in improved data availability and offering the potential for enhanced operations. In addition, the Department has initiated a flood pump motor study, this requires the temporary removal of selected motors for a condition assessment. The Wastewater Services Division is continuing with its program to evaluate and upgrade the configuration of the flap and positive gates at the automated stations.

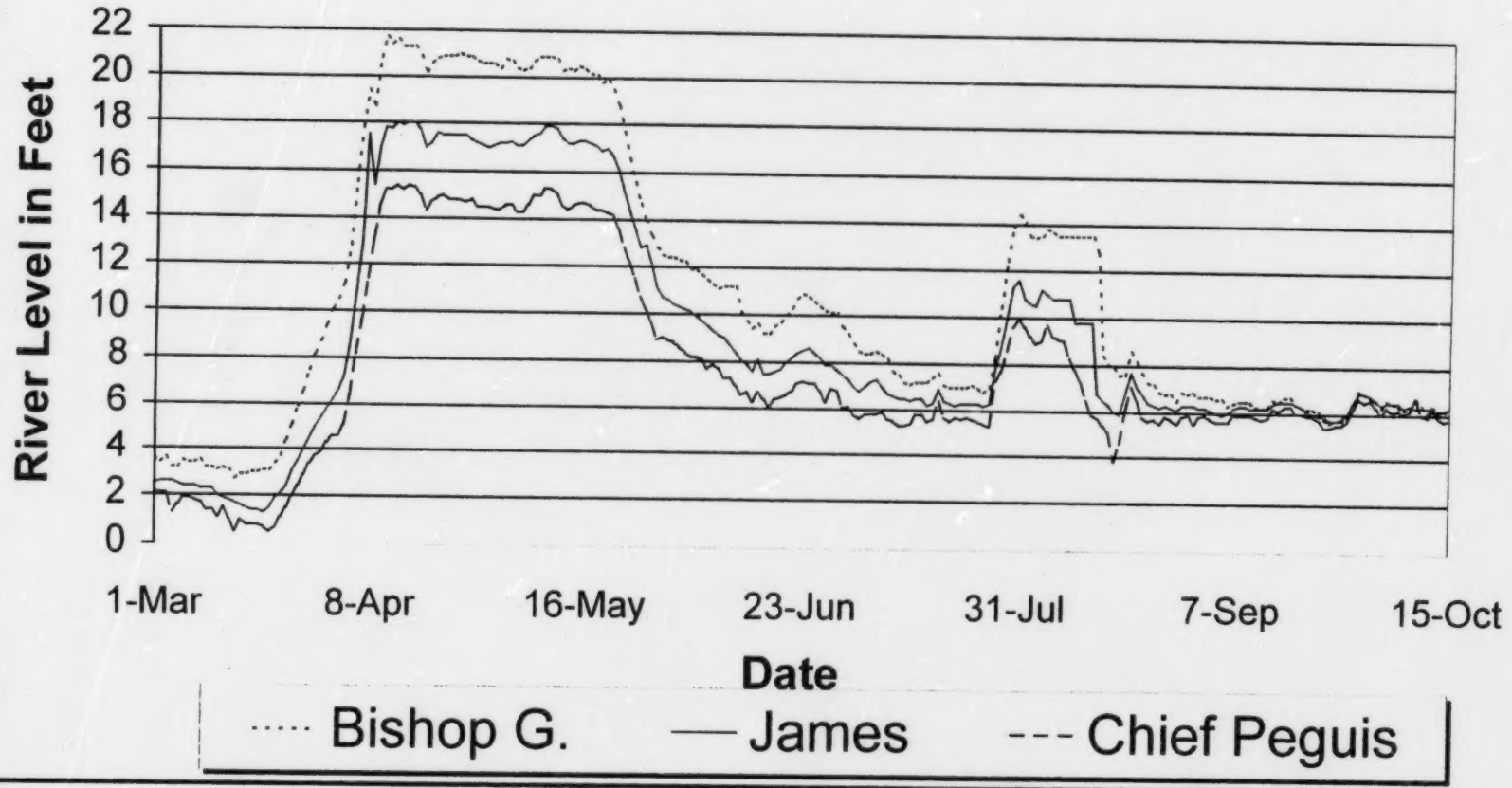
During 2001, river levels were recorded at James Avenue, and the Bishop Grandin (Route 165) and Chief Peguis bridges on the Red River. Additional river level monitors have been added at Osborne, Maryland and St. James Street bridges on the Assiniboine River. Generally, levels are forecast and flood operations proceed on the basis of James Avenue river levels.

Monitoring of some Stormwater Retention Basin levels was undertaken in 2001, specifically in the Whyte Ridge and Bunn's Creek areas. Performance of the Lot 16 Drain and other major channels was excellent in 2001 as no Stormwater Retention Basin drainage difficulties were encountered.

The Wastewater Services Division has continued in its efforts to upgrade the information provided in the Flood Control Manual. Furthermore, development of a digitally based Flood Manual continued in 2001 (see Section 5.0).

2001 FLOOD LEVELS

March 1 - October 15



THE CITY OF WINNIPEG
WATER & WASTE DEPARTMENT
ANNUAL FLOOD ACTIVITY REPORT
2001

FLOOD PUMPING STATION	GATE CHAMBER	ACTIVATION/GATE CLOSED			DEACTIVATION/GATE OPENED		
		DATE	TIME	RIVER ELEV	DATE	TIME	RIVER ELEV
	St. Mary's Rd.	01 04 04	11:30	8.8	01 06 13	10:05	7.9
	Rainbow Stage	01 04 04 01 06 22 01 07 27	09:45 13:25 11:00	8.8 8.5 9.1	01 06 14 01 07 23 01 08 16	09:48 11:00 09:10	7.6 6.3 6.3
	Armstrong Crossover	01 06 08	11:30	9.1	01 04 04	13:15	9.1
Fort Rouge Park		01 04 04 01 08 07	09:45 10:45	8.8 10.8	01 06 08 01 08 16	13:30 09:27	9.1 6.3
Marion		01 04 03 01 06 14 01 07 27	14:15 20:30 10:00	7.5 8.0 8.0	01 06 13 01 07 04 01 08 16	10:00 09:00 13:20	7.9 7.0 6.3
Despins		01 04 04 01 07 28	09:40 12:00	8.9 9.1	01 06 11 01 08 16	09:15 13:45	8.4 6.3
	St. Norbert X-Kalay	01 04 12	14:00	18.0	01 06 10	14:00	8.5
	Wildwood Golf Course	01 04 07	15:30	18.4	01 06 10	14:00	8.5
	Aubrey (storm)	01 04 05	10:30	11.1	01 05 28	11:30	11.1
	Ruby	01 04 05	11:58	11.1	01 05 28	10:00	11.1
	Trappiste @ Pembina	01 04 07	11:10	18.4	01 05 22	10:00	15.1
Baltimore		01 04 06	15:25	14.4	01 05 24	10:00	13.6
LaVerendrye		01 04 05 01 07 29	08:35 20:00	10.7 10.8	01 05 28 01 08 16	08:35 13:55	11.1 6.3
Larchdale		01 04 06 01 05 09	10:00 11:15	13.1 17.9	01 05 30	13:00	10.6
Jefferson		01 04 06	09:20	13.0	01 05 25	10:20	12.7
Linden		01 04 06	10:20	13.2	01 05 25	10:00	12.7
Mager Dr.		01 04 06	10:15	13.2	01 05 31	10:00	10.4
Metcalfe		01 04 06	09:55	13.2	01 05 25	09:30	12.8

THE CITY OF WINNIPEG WATER & WASTE DEPARTMENT ANNUAL FLOOD ACTIVITY REPORT 2001							
	Ducharme @ Villineuve	01 04 09	14:00	17.0	01 05 10	14:00	15.2
	McDermot	01 04 06	14:30	13.5	01 05 24	09:45	13.6
	Burrows	01 04 06	14:30	13.5	01 05 24	10:30	13.6
	Pembina & Minerva	01 04 09 01 07 27	10:00 14:00	17.2 9.1	01 05 23 01 08 02	09:45 14:00	14.3 10.8
	Kilkenny & Rice	01 04 11	13:00	17.7	01 05 07	11:30	17.5
Cockburn		01 04 06	14:30	13.2	01 05 24	09:45	13.6
Newton		01 04 06	09:35	13.0	01 05 24	12:45	13.6
Archibald Underpass		01 04 06	11:15	13.2	01 05 23	10:30	14.2
Bannatyne		01 04 06	09:15	13.2	01 05 24	13:00	13.6
	Parkwood Dike (South Culvert)	01 04 09	15:00	18.0	01 05 10	14:00	15.7
	Bredin Drive (set up pump)	01 04 06	14:45	14.3	01 05 23	11:00	13.7
	Rainbow Stage (Outfall)	01 04 04	13:00	9.1	01 08 16	09:10	6.3
	Canora	01 04 06	11:33	13.7	01 05 23	09:20	14.2
	Parkwood Dike (North Culvert)	01 04 09	15:10	17.1	01 06 10	14:00	15.7
	Turnbull Drive Culvert	01 04 07	20:00	16.6	01 05 23	09:30	14.3
Hart		01 04 06	10:35	13.2	01 05 23	12:30	14.2
Syndicate		01 04 06	10:55	13.2	01 05 23	11:17	14.2
Dumoulin		01 04 06	12:25	13.7	01 05 22	10:00	15.2
Galt		01 04 06	12:15	13.7	01 05 22	11:00	15.2

THE CITY OF WINNIPEG WATER & WASTE DEPARTMENT ANNUAL FLOOD ACTIVITY REPORT 2001							
Polson		01 04 06	14:50	14.3	01 05 22	11:30	15.2
	Deer Lodge Place	01 04 06	12:45	13.2	01 05 22	11:00	15.1
	Douglas Park	01 04 06	13:15	13.2	01 05 22	11:00	15.1
	Lemay & Lord	01 04 07	11:00	18.4	01 05 22	09:55	15.1
	Kingston Row Underpass	01 05 08	11:00	17.7	01 05 15	15:00	17.3
Assiniboine		01 04 07 01 05 06	12:00 23:20	18.1 17.7	01 04 27 01 05 24	14:15 09:30	8.9 13.6
Colony		01 04 07 01 05 06	11:35 22:00	18.1 17.7	01 04 27 01 05 24	14:04 12:00	17.01 13.6
Mayfair		01 04 07 01 05 06	12:45 23:00	18.1 17.7	01 04 27 01 05 24	14:20 09:35	17.09 13.6
Roland		01 04 07 01 05 07	13:15 22:35	18.1 17.8	01 04 27 01 05 24	14:40 09:15	17.09 13.6
Aubrey		01 04 07 01 05 07	18:00 01:00	18.0 17.8	01 04 27 01 05 24	13:50 10:15	17.09 13.6
Ash		01 04 07 01 05 06	18:00 00:00	18.0 17.7	01 04 27 01 05 22	13:40 13:00	17.09 15.2
Jessie		01 05 07	20:00	17.6	01 05 22	10:00	15.2
	Donald	01 04 09	09:19	17.2	01 05 18	13:00	17.0
	Water Ave.	01 04 09	09:39	17.2	01 05 18	12:30	17.0
	Hawthorne	01 05 09	00:15	17.9	01 05 09	15:00	17.9
Mission		01 04 10 01 05 06	14:00 23:00	17.9 17.8	01 04 27 01 05 24	14:30 08:55	17.09 13.6
St James Underpass		01 04 07 01 05 06	16:45 23:00	18.4 17.7	01 05 01 01 05 24	09:15 11:15	17.3 13.6
	Lannoo & William Marshall	01 04 10 01 05 06	12:30 15:30	17.9 17.9	01 04 18 01 05 29	13:00 12:00	17.2 10.7

2.0 EXTENSIONS AND REDESIGNATIONS OF THE PRIMARY LINE OF FLOOD DEFENCE

2.1 East Area

2.1.1 Kildonan Drive Dike - Investigations providing for extension of the Primary Line of Defence north of the Bergen cut-off are on-going, in association with Development applications on the cut-off. On February 13, 1991, the City was granted a dike easement through the lands zoned Park on the Edgewood Estates' property, north of the Bergen cut-off and at the north end of Kildonan Drive. On February 17, 1992, the Diking Commissioner granted approval-in-principle for the designation of lands through Edgewood Estates' property as Primary Line of Flood Defence. Finalization of the easement agreement is pending upon review by the property owner.

During the 1997 Spring Flood event, a permanent earth dike was constructed through the Edgewood Estates' property extending from the Kildonan Drive right-of-way at the South to the existing embankment of the Chief Peguis Trail to the North. In December 1999, the Water and Waste Department requested the Diking Commissioner's approval-in-principle for designation of the dike as per drawings described in Section 3.0.

2.1.2 Evans Street Dike - Land acquisition of private lands along the west Seine River bank is essentially complete. Land acquisition negotiations are on-going for private lands along the east Seine River bank. Once secured, the lands will accommodate relocation of the Seine River at a bend, and stabilization and reconstruction of Evans Street from Gareau Street to Deniset Street for its proposed designation as a Primary Line of Defence. Some 200 dwellings and several sewer overflows will be added to the City's flood protection system through this initiative.

2.1.3 Normand Park Development Dike - The most recent extension of the primary dike along the north limit of the Normand Park Development was completed in December, 1989; however deficiencies were only rectified in November, 1992. Certificates were issued for the dikes in the last two of the five developments. In December 1999, the Water and Waste Department requested the Diking Commissioner's approval-in-principle for designation of the dike as per the drawings described in Section 3.0.

2.1.4 St. Anne's Road Dike – In December 1999, the Water and Waste Department requested the Diking Commissioner's approval-in-principle for designation of the dike as per the drawings described in Section 3.0.

2.1.5 St. Mary's Road Dike – In December 1999, the Water and Waste Department requested the Diking Commissioner's approval-in-principle for designation of the dike as per the drawings described in Section 3.0.

2.2 North Area

2.2.1 The Forks Development Dike - A leakage test on the chamber was performed and passed on February 21, 1992. Deficiencies regarding modifications to the top of the structure are still outstanding. The Water and Waste Department will be proceeding with application for redesignation of the dike once final acceptance of the gate chamber is issued.

On June 18, 1993, the Water and Waste Department requested approval-in-principle of a dike realignment as a result of a proposed plaza/archaeological dig site at the Forks. On July 21, 1993, the Diking Commissioner granted approval-in-principle for this relocation. The project proceeded as a plaza in 1997 without the archaeological dig site. Therefore, the primary dike alignment was not relocated. Redesignation with this portion of the dike will be part of the whole Forks Development, as above.

2.2.2 Timber Crib Dike - This dike has been replaced by a new earthen dike, which forms part of the extension of Pioneer Boulevard North of the Provencher Bridge. This work proceeded in late 1998 as part of the construction related to the new baseball facility on the North side of Water Avenue. The Acting Diking Commissioner granted approval for realignment of the Primary Line of Defence on September 14, 1998.

Plans to remove the remaining portion of the Timber Crib Dike and replace it with an earthen dike, were drafted as part of the Provencher Bridge Project.

2.2.3 Dike along former Winnipeg Railway – Plans to relocate the primary dike from Lombard Avenue to Higgins Avenue, were drafted as part of the proposed Waterfront Drive Project.

2.3 South Area

2.3.1 Plaza Drive and Adamar Road Dikes - Easements have been secured for the dike between Plaza Drive and Bishop Grandin, and for the dike from Adamar Road to Plaza Drive. The Water and Waste Department has surveyed and will be preparing drawings of a portion of Bishop Grandin Boulevard to link the Plaza Drive dike to the D'Arcy Drive dike. In December 1999, the Water and Waste Department requested the Diking Commissioner's approval-in-principle for designation of the dike as per the drawings described in Section 3.0. This includes the dedesignation of those portions of the dike becoming redundant along Pembina Highway, University Crescent, Agassiz Drive and Glengarry Drive.

2.3.2 St. Norbert Daycare Dike - The St. Norbert Daycare proposed the installation of playground equipment on a portion of the primary dike. The Water and Waste Department provided a drawing showing where the new dike is to be realigned to by-pass equipment. Upon completion of all drawings, this Department will proceed with application for redesignation.

2.3.3 St. Norbert School Dike - During the 1997 Spring Flood event, a permanent earth dike was constructed through the Seine River School Division property extending from the existing dike South of the St. Norbert Cemetery at the East to Rue Campeau to the West. In December 1999, the Water and Waste Department requested the Diking Commissioner's approval-in-principle for designation of the dike as per the drawings described in Section 3.0.

2.3.4 St. Norbert Dike - During the 1997 Spring Flood event, the permanent earth dike was raised from the South end of the Lord Avenue right-of-way to the North end of the Rue St. Pierre right-of-way. The St. Norbert dike as well as the St. Norbert Cemetery and Seine School Division dikes (Section 2.3.3), provides for a continuous length of dike, which will protect in excess of 50 additional properties. The Water and Waste Department will be proceeding with application for designation of the dike once all drawings described in Section 3.0 are complete for this area and easements are secured.

3.0 PRIMARY LINE OF DEFENCE (PLD) MAPPING

The Water and Waste Department has completed a project initiated in 1986 to produce plan/profile drawings of the City's 115 kilometres of primary dikes. These drawings update the plan/profiles prepared by the Provincial Water Control and Conservation Branch in 1967 in a modern, revisable format. The drawings also identify deficiencies in the diking system, location of manholes, pipes, catch basins, outfalls and control chambers which breach the dike, and areas where the dike must be realigned to keep pace with new development. 119 plan/profile drawings at a scale of 1:2000 have been produced.

The project is divided into 7 drawing series corresponding to the different sides of the Rivers. The Series are described as follows:

- Series 100 contains 16 drawings covering the West side of the Red River from the Forks North to the City limits.
- Series 200 contains 8 drawings covering the North side of the Assiniboine River from St. James Street East to the Forks.
- Series 300 contains 8 drawings covering the South side of the Assiniboine River from Kenaston Boulevard East to the Forks.
- Series 400 contains 28 drawings covering the West side of the Red River from St. Norbert North to the Forks.
- Series 500 contains 26 drawings covering the East side of the Red River from the Floodway North to the junction of the Seine River.
- Series 600 contains 16 drawings covering the West side of the Seine River from the Floodway North to the junction of the Red River.
- Series 700 contains 17 drawings covering the East side of the Seine and Red rivers from the Floodway North to the City limits.

Further to the recommendations of the Manitoba Commission Report (June 1998) and the subsequent responses by the Diking Commissioner (1998 Annual Report of the Diking Commissioner – Appendix E), the Water and Waste Department of the City of Winnipeg in December 1999, requested the Diking Commissioner's approval-in-principle for many of the proposed extensions/redesignations to the Primary Line of Defence described in Section 2.0.

4.0 SECONDARY LINE OF DEFENCE (SLD)

The City of Winnipeg actively planned, prepared for and undertook specific flood protection activities as necessary in response to the high river levels and overland flooding in the Spring of 1997. For the "Flood of the Century," the City protected over 800 properties with temporary secondary dikes, most with 8.1 million sandbags and 50 locations with earthfill (600,000 m^3).

As a result of the Canada-Manitoba-City of Winnipeg Agreement on Secondary Diking Enhancements (November, 1999), $11.1 million has been allocated to undertake three initiatives related to permanent secondary dikes. These are:

1) community ring dike sites feasibility study ($400,000);
2) construction of community ring dikes ($6.3 million), and;
3) construction of flood proofing works at individual sites ($4.4 million).

The Community Ring Dike Sites Feasibility Study was completed in 2001. The first community ring dike to get underway was the Kingston Crescent/Row project in late December. Several individual flood proofing projects were completed or underway in 2001.

The City of Winnipeg has also passed a "Secondary Dike By-law" that protects the integrity of existing permanent dikes and establishes a diking corridor at locations where temporary secondary dikes would be required in an emergency. The corridor prevents obstructions, such as decks or garages, which would impede the timely erection of a temporary dike.

5.0 FLOOD ACTIVITY / EMERGENCY MANUAL

The Water and Waste Department has engaged Professional Engineering Services for the preparation of an overall flood activity and emergency manual for the entire City of Winnipeg which will consolidate and update existing information and develop activities for portions of the City where activity manuals do not currently exist.

The intent of this project is to provide a detailed and comprehensive operations Flood Activity / Emergency Manual for all Combined and Separate Sewer Districts within the City of Winnipeg describing flood activities required such as gate monitoring, gate closures, activation of pumping facilities, installation and activation of temporary pumping facilities, raising primary dikes, erecting secondary dikes at various river stages to ensure proper and prompt action by staff to protect properties from overland and basement flooding for a water elevation equivalent to 25.8 feet at James Avenue Datum (i.e.- water level corresponding to the Flood Protection Level).

Work on this project has continued through 2001 and significant progress has been made. Works have been gearing towards a trial run of the Flood Manual for the spring of 2002 flood event. Completion of this project is anticipated to be in the fall of 2002.

6.0 RESPONSES TO DIKING COMMISSIONER'S QUESTIONNAIRE

The following are the responses from the Public Works Department and the Water & Waste Department:

6.1 Engineering Division – Public Works Department.

6.1.1 For the Reporting Year.

a) There were no difficulties or problems encountered.

b) There was no maintenance or repairs carried out.

c) There were no new sewer outfall gate structures constructed for the reporting year.

d) Provencher Bridge – In conjunction with the construction of the new bridge, the East and West slopes have been stabilized to provide a minimum Factor of Safety of 1.5. At final stages of construction, riprap erosion control will be installed on both banks within the vicinity of the bridge.

6.1.2 Proposed Plans for Future.

a) Riverbank monitoring will be initialized on the east bank of the Red River at the Redwood Bridge in 2002 as a supplement to structure movement monitoring.

b) Continue monitoring existing slope indicators on a rotating scheduled basis.

c) The Provencher Bridge Project will include construction of a new primary dike adjacent to Pioneer Boulevard and Pioneer Avenue.

d) Waterfront Drive, from Lombard Avenue/Pioneer Boulevard intersection to the Higgins Avenue/May Street intersection will be constructed from 2001 to 2002. Work will include constructing the roadway as a primary dike and stabilizing the riverbank to a Factor of Safety level of 1.5.

6.1.3 Riverbank Stability.

a) There was no evaluation of riverbank stability in critical areas.

b) Riverbank erosion is monitored by visual inspection at all river crossings on an annual basis. Erosion was unremarkable in 2001.

c) There were no remedial works undertaken or completed.

6.1.4 Availability and Location of Proposed Borrow Pits.

a) There was no change to the availability and location of proposed borrow pits.

6.2 Engineering Division - Water & Waste Department.

6.2.1 Selkirk Flood Station – flap gate relocated to downstream of the pump intakes.

6.2.2 Cairossie Outfall – existing outfall abandoned and a new outfall installed through Toiler's Park.

6.2.3 Linden Flood Station – existing concrete outfall replaced with a new 1500mm diameter corrugated steel pipe.

6.2.4 Colony Flood Station – existing brick sewer outfall replaced with a new 1800mm diameter structural plate corrugated steel pipe.

6.3 Water Services Division - Water & Waste Department.

6.3.1 There were no problems encountered with any sewer facilities with respect to high river levels or leaking gates.

6.3.2 There were no repairs were carried out on the sewer system to maintain or improve flood protection.

6.3.3 There were no construction or upgrading projects on any of the sewer outfall structures.

6.3.4 There were no other modifications made to the sewer system or diking system.

UNIVERSITY OF MANITOBA

PHYSICAL PLANT

89 Freedman Crescent
Winnipeg, Manitoba
Canada, R3T 2N2

FAX: (204) 474-7547

January 18, 2002

Mr. Rick Hay, P. Eng.
Dyking Commissioner
Water Resources Branch
Box 19 - 200 Sauteaux Crescent
Winnipeg, Manitoba
R3J 3W3

Dear Mr. Hay:

Subject: **Dyking Commissioner's 2001 Annual Report**

The following is in response to the questionnaire for the Annual Report on the Primary Dyking Systems within the City of Winnipeg.

1. **2001 Calendar Year**

a) Difficulties and problems encountered. None

b) Maintenance and repairs carried out.

A section of discharge pipe from outfall #1 was replaced in early February 2001. This was necessary due to a section being crushed when the remedial work was done in early 2000.

c) New Sewer Outfall Gate Structures constructed.

None.

d) Improvements and modifications carried out.

None

2. **Proposed Plans for Future**

There are no further plans for new structures or modifications at this time.

a) Evaluation of river bank stability in critical areas.

There are no evaluation studies underway or planned at this time.

b) Monitoring erosion of river banks in critical areas.

Monitoring of riverbanks is conducted regularly at 13 river bank locations. There was no significant erosion detected during 2001.

c) Any remedial works undertaken or completed in the reporting year.

As noted in #1, question b).

3. **Availability and Location of Proposed Borrow Pits.**

No changes are suggested in the availability or location of proposed borrow pit for 2002.

Yours truly,

Brian J. Rivers
Director of Physical Plant

bjr/nl

cc: Mr. M. McAdam, Vice-President (Administration)
Mrs. D. McCallum, Associate Vice-President (Administration)

14 Appendix E

Revised Rules of Operation
For Red River Floodway Inlet Control Structure

Rules of Operation
Red River Floodway Control Structure

December, 2000

Normal Operation:

1. Maintain "natural"* water levels on the Red River at the entrance to the Floodway channel, until the water surface elevation at James Avenue reaches 24.5 feet (7.46 m.), or the river level anywhere along the Red River within the City of Winnipeg reaches two feet below the Flood Protection Level of 27.83 feet (8.48 m).

Major Flood Operation:

2. Once the river levels within Winnipeg reach the limits described in Rule 1, the level in Winnipeg should be held constant while levels south of the Control Structure continue to rise. Furthermore if forecasts indicate that levels at the entrance to the Floodway channel will rise more than two feet (0.6 metres) above natural, the City must proceed with emergency raising of the dikes and temporary protection measures on the sewer systems in accordance with the flood level forecasts within Winnipeg. The levels in Winnipeg should be permitted to rise as construction proceeds, but not so as to encroach on the freeboard of the dikes or compromise the emergency measures undertaken for protecting the sewer systems. At the same time the Province should consider the possibility of an emergency increase in the height of the Floodway embankments and the West Dike. At no time will the water level at the Floodway channel's entrance be allowed to rise to a level that infringes on the allowable freeboard on the Floodway west embankment (Winnipeg side) and the West Dike.

Extreme Flood Operation:

3. For extreme floods, where the water level at the Floodway channel's entrance reaches the maximum level that can be held by the Floodway west embankment and the West Dike, the river level must not be permitted to exceed that level. All additional flows must be passed through Winnipeg.

Initial Gate Operation with Ice:

The Floodway gates should not be operated until ice on the river is flowing freely, unless flooding in Winnipeg is imminent.

Final drop of Gates:

To minimize bank slumping along the river in Winnipeg and at the same time reduce the probability of sewer backup problems, final gate operations, once the level at the entrance to the Floodway Channel recedes to elevation 752 feet (229 metres), shall be carried out in consultation with the City of Winnipeg.

Operation of Horn:

The horn at the Floodway Structure shall only be operated once, before the first gate operation of the year. The horn should be sounded a half-hour before the first gate operation to alert residents that the Floodway Structure is being put into operation. For ongoing information a 1-800 number should be established that would provide current information of gate operations, potential impacts on water levels, and forecasts for the next few days. The information should also be included on the existing Water Resources internet site.

* The term "natural" refers to the level that would have occurred in the absence of the flood control works, with the level of urban development in place at the time of the construction of these works.